

At the same time, Bell Atlantic and other phone companies have engineered their switches to guarantee that virtually every call is successfully completed the first time it is dialed. Call completion rates are the same for Internet access as they are for 911 – better than 99.9 percent, even during periods of peak use.¹⁴⁶ ISPs, by contrast, have opted to deploy far fewer ports, routers, and other components that determine how often incoming calls get blocked. As legions of frustrated Internet subscribers have discovered, ISP connections are sometimes wholly unavailable for lengthy periods. During peak usage hours, ISPs on average connect only 87 percent of calls on the first try.¹⁴⁷

Finally, unscheduled switch outages are very rare in the local phone network. In the third quarter of 1995, for example, there were only six instances of unplanned switch outage of more than two minutes in the entire Bell Atlantic region.¹⁴⁸ In 1996, Bell Atlantic's switches had a reliability well over 99.99 percent: they averaged a mere 5 minutes of down time, scheduled or unscheduled, per year.¹⁴⁹ ISP service failures appear to be much more common, though regulators do not gather any precise statistics. A simple power outage in BBN's California office pulled the plug on Internet access for BBN customers like Hewlett Packard and the Los Angeles

¹⁴⁶ Bell Atlantic's dial response rate – the percentage of calls successfully signal the terminating line, receiving either a busy signal or ring – was almost as high, at 99 percent.

¹⁴⁷ R. Barrett, *Internet Working Better, Says New Study*, Interactive Week, July 23, 1997.

¹⁴⁸ FCC, Update on Quality of Service for the Local Operating Companies Aggregated to the Holding Company Level at Table 6(B) (Mar. 1996).

¹⁴⁹ W. Taren, *How Reliable is the Public Network*, Telephony, Feb. 10, 1997, at 30.

Times.¹⁵⁰ A rat chewing through a cable near Stanford University caused an outage leading to the loss of an estimated one billion man-hours of Internet use.¹⁵¹

Cable and wireless providers likewise have invested far less capital, and built far less network. Cable companies have deployed few switches of any kind,¹⁵² and have not linked in to the nationwide digital signaling system (SS7) at all. Only 10 to 20 percent of cable subscribers are served by networks that have been upgraded to support two-way traffic. Tests of cable modems are under way, and a few companies already offer commercial service, but these initiatives remain small and localized for now.¹⁵³ Only about 15 percent of cellular networks are digital.¹⁵⁴ Wireless data services remain quite limited, expensive, and slow.¹⁵⁵ Cellular Digital Packet Data (CDPD) services are being rolled out slowly,¹⁵⁶ and are currently used by only about 10,000 customers.¹⁵⁷

¹⁵⁰ B. Klein, *Are Power Outages a Fact of Life For Online Marketing?*, Business Marketing, Nov. 1, 1996, at M8.

¹⁵¹ J. R. Dukart, *Internet Still Collapsing, Metcalfe Says*, Telephony, July 7, 1997 (citing Bob Metcalfe). The reliability of the backbone networks is questionable as well. See Section II.

¹⁵² Cable companies have deployed some 53 switches nationwide. Bellcore, TR-EOP-00315, Local Exchange Routing Guide (LERG), Dec. 1, 1997.

¹⁵³ More than 4.5 million homes have been upgraded to receive cable modem service, and operators now boast more than 60,000 subscribers. J. Peline, *Cable Modems Fight for Lead*, CNET News.com, Nov. 20, 1997, <http://www.news.com/SpecialFeatures/0%2C5%2C16615%2c00.html>. @Home leads the way, with 26,000, followed by Time Warner with 20,000 and MediaOne with 10,000.

¹⁵⁴ Donaldson, Lufkin, & Jenrette Securities, Ind. Rpt No. 1875854, The Wireless Communications Industry at Table 13A (Mar. 7, 1997). Although most of their systems are analog, cellular systems were built after the introduction of the digital switch, and their switching has been digital from the beginning.

¹⁵⁵ Some 152,000 wireless modems were sold in 1996. J. Kim, *In the Fast Lane: Wireless Services*, USA Today, Nov. 29, 1996, at 3B. Cellular One currently only supports a maximum throughput of 14.4 kbps. See Cellular One, *Frequently Asked Questions*, <http://www.cellone-sf.com/lobandwidth/faq.html>. It is also not clear how many wireless subscribers who do use the airways to access the Internet use this as an alternative only when they are on the move, relying on the LEC networks for the bulk of their access.

¹⁵⁶ F. Blackwood, *Getting Unwired*, San Francisco Business Times, Dec. 20, 1996, at A14; I. Brodsky, *The Net Unplugged*, Telephony, Mar. 3, 1997.

¹⁵⁷ *GTE Wireless Launches Long-Anticipated CS-CDPD Service*, Wireless Data News, Feb. 5, 1997. The

Unlike most of the companies that now dominate Internet backbone networks, the Bell Companies do not avoid residential markets. Bell Atlantic serves some 24 million residential customers,¹⁵⁸ and generally offers new services region-wide. As discussed in Section II, Bell Atlantic already offers ISDN service to almost all its subscribers, residential and business alike. Bell Atlantic plans to begin offering ADSL service to residential customers in its region in mid-1998 in major markets, even before it begins offering the service to businesses.¹⁵⁹ Bell Atlantic serves Ketcham Elementary in Southeast Washington, D.C., just as it serves high-tech businesses in Reston, Virginia. Bell Atlantic's World School program provides high-speed Internet access to almost 700 of West Virginia's 850 schools.¹⁶⁰ Bell Atlantic has committed \$7 million over seven years to provide Internet access to Virginia public schools, and \$4 million to wire Washington, D.C. public schools and libraries.¹⁶¹ Bell Atlantic has announced it will spend \$20 million to build a broadband network serving West Virginia, its most rural state.¹⁶² Bell Atlantic

other major packet data network, Ricochet, is designed for Web browsing and has just over the 15,000 subscribers. *Metricom's Ricochet Wireless Network and Internet Service Passes the 15,000 Subscriber Mark*, Business Wire, July 1, 1997. In June 1997, CellularVision, the only company providing Internet access through LMDS, introduced unlimited high-speed Internet access in its New York City service area. M. Landler, *Integrated Wireless Service May Be Coming Soon to a Windowsill Near You*, N.Y. Times, July 7, 1997, at D3. According to one observer, wireless Internet access suffers from "[p]oor coverage, low throughput, high latency, limited battery life, arcane protocols and high prices," handicaps which "are hardly ingredients for success." I. Brodsky, *The Net Unplugged*, Telephony, Mar. 3, 1997.

¹⁵⁸ FCC, Statistics of Communications Common Carriers, 1996/1997 Edition at Table 2.10 (Jan. 1998).

¹⁵⁹ J. Rendleman, *Home's Where Hard Sell Is*, Communications Week, May 26, 1997.

¹⁶⁰ As a result, West Virginia leads the nation in the percentage of students with Internet access (85 percent). E. Hutkin, *Actor Praises Internet Links*, Charleston Daily Mail, June 5, 1997.

¹⁶¹ Bell Atlantic Press Release, *Bell Atlantic Gives Virginia Schools \$1 Million for Interactive Distance Learning*, Jan. 13, 1998; Bell Atlantic Press Release, *Bell Atlantic Makes \$4 Million Holiday Gift to Students*, Dec. 11, 1997.

¹⁶² Bell Atlantic Press Release, *Bell Atlantic to Build High-Speed Network for Mountain State*, Oct. 14, 1997.

and Virginia Tech wired Blacksburg, Virginia to create the world's first "electronic village."¹⁶³

In Philadelphia, a \$500,000 Bell Atlantic grant placed computers in all 256 public school libraries, giving Internet access to 215,000 school children and 12,000 teachers.¹⁶⁴

In the summer of 1996, Bell Atlantic also began rolling out Internet access services to its business and residential customers, and has since expanded throughout its region. The company operates under significant handicap in this market, because it cannot independently ensure the quality of backbone services to which it must interconnect,¹⁶⁵ and because, unlike all other ISPs, its customers must designate a second Internet carrier for all "interLATA" Internet traffic.¹⁶⁶ Bell Atlantic has nevertheless signed up about 100,000 Internet customers.¹⁶⁷ Under Bell Atlantic's Internet access architecture, Bell Atlantic concentrates dial-up, ISDN, and T-1 connections at a single central office in every LATA. The traffic is then routed to the appropriate backbone at speeds up to 34 Mbps.¹⁶⁸

¹⁶³ See Blacksburg Electronic Village, <http://www.bev.net>.

¹⁶⁴ Bell Atlantic Press Release, *Bell Atlantic Grant Puts Philadelphia School Libraries on the Net*, May 28, 1996.

¹⁶⁵ WorldCom/UUNet's John Sidgmore has remarked that, "In a market driven by unprecedented demand for bandwidth, you have got to be facilities based. Having access to infrastructure at the lowest possible cost will enable you to control bandwidth deployment and availability of services end-to-end." Indeed, Sidgmore predicts that in the next few years, non-facilities-based ISPs will be reduced to niches or be driven out of business. *UUNet Says Bandwidth Control Key Internet Strategy*, Reuters Financial Service, Dec. 12, 1996; see also *id.* (quoting Sidgmore: "There will be a segmentation coming between core Internet service providers who provide the infrastructure or network and Internet service specialists who resell our services with specialized features."); D. Pappalardo, *The Comfort Zone*, Network World, Oct. 6, 1997, at 52 (Bell Companies have been successful ISPs despite not having their own backbones to market).

¹⁶⁶ To comply with its interexchange equal access requirements, Bell Atlantic requires every customer to select a Global Service Provider, essentially an Internet version of a long-distance presubscribed interexchange carrier. Bell Atlantic Internet Solutions, *Global Service Providers*, <http://www.bellatlantic.net/faqs/>.

¹⁶⁷ R. Krause, *Baby Bells Face Dilemma in Speeding Online Access*, Investor's Business Daily, Sept. 22, 1997, at A6.

¹⁶⁸ D. Rohde, *Bell Atlantic to Debut 'Net Access in NYNEX Territory*, Network World, June 2, 1997, at 33. Bell Atlantic has installed Cisco routers at 64 POPs throughout the traditional Bell Atlantic region. *Remote Access:*

GTE's experience since it purchased BBN this summer is instructive. GTE's investments in backbone capacity demonstrate the level of financial commitment that can be expected from large telephone companies. After purchasing BBN, GTE paid Qwest nearly \$500 million for new fiber capacity, and signed an agreement with Cisco to purchase \$1 billion worth of backbone routers over the next five years.¹⁶⁹ This amount of investment was beyond BBN's financial capabilities prior to its purchase by GTE.¹⁷⁰

By contrast, the WorldCom/MFS Washington, D.C. fiber ring runs only through business areas in downtown Washington and a few high-tech communities nearby.¹⁷¹ WorldCom/UUNet will not even market to the residential communities surrounding the city. AT&T allows only its business customers access to its new, superior quality network.¹⁷² MCI's bundled MCIOne product, which includes Internet access, is carefully targeted toward "high-value customers who use multiple services," and MCI's announced strategy is to "continue to transition away from low-value mass market customers."¹⁷³ Sprint similarly targets only low-churn, high-revenue customers for its Internet Passport service.¹⁷⁴

Bell Atlantic Turns On Service With Cisco Dial Access Solutions, Edge, Apr. 7, 1997.

¹⁶⁹ T. Poletti, *GTE to Buy BBN and Fiber Optic Network, Sets Cisco Alliance*, Reuters Financial Service, May 6, 1997.

¹⁷⁰ K. Girard, *BBN Customers Counting on GTE's Deep Pockets*, Computerworld, May 12, 1997, at 6; M. Semilof, *Internet Pioneer Rechristened*, Computer Reseller News, Sept. 15, 1997 (quoting Tom Perkins, GTE Networking vice president: "BBN alone couldn't have done all of this.").

¹⁷¹ The ring loops the downtown area bordered roughly by Constitution, Fourth and K Streets, N.W., then loops out to business parks in northern Virginia (Reston, Dulles) and the Interstate 270 Technology Corridor in Montgomery County, Md.

¹⁷² AT&T Press Release, *AT&T Announces Business-Quality IP Services*, Oct. 8, 1997.

¹⁷³ MCI, *1Q97 Investor Quarterly*, http://investor.mci.com/investor_pubs/quarterlies/qr_1997/qr_1997-1.html.

¹⁷⁴ *Sprint Has Dual Strategy*, Internet Week, June 9, 1997.

Experience teaches that deregulation and competition will impel rapid new investment in advanced telecom capabilities and the delivery of advanced services to every segment of the market. In the long distance voice network of the 1980s, it was Sprint's aggressive early investments in fiber-optic technology that forced AT&T and MCI to abandon microwave and deploy fiber nationwide themselves; Sprint's owners were two local phone companies, GTE and the former United Telephone. In television markets of the 1960s and 1970s, cable companies deployed coaxial cable to multiply the bandwidth available for television transmission by a factor of ten or more. Incumbent broadcasters had little incentive to deploy the new, high-bandwidth technology, and indeed did all they could to suppress it. Cable companies themselves then grew complacent – except in the few markets where regulators permitted a second cable operator to overbuild the first. Cable television rates in markets that allowed competition consistently fell 20 to 30 percent below those in markets that did not.¹⁷⁵ And competition got residences wired up notably faster than “universal service” directives aimed by regulators at monopolists.¹⁷⁶

Cable operators have been quick to exploit their regulatory advantages over local telephone companies when it came to providing high-speed access to the Internet through cable modems. Interactive cable services are free from cable rate regulation and any type of Title II regulation. Cable operators plan to spend an estimated \$3 billion over the next three years on

¹⁷⁵ Affidavit of Thomas W. Hazlett, *attached to* Motion of Bell Atlantic Corp., Bell South Corp., NYNEX Corp., and Southwestern Bell Corp. to Vacate the Decree, *United States v. Western Elec. Co.*, No. 82-0192 (D.D.C. July 6, 1994). *See also* Affidavit of Thomas W. Hazlett at ¶¶ 11-13 & n.4, *attached to* Joint Comments of Bell Atlantic, GTE, and the NYNEX Tel. Cos. in Response to Further Notice of Proposed Rulemaking, Implementation of Sections of the Cable Television Consumer Protection and Competition Act of 1992: Rate Regulation, CS Dkt. No. 92-266 (F.C.C. filed June 17, 1993) (cable systems that actually faced competition from other multichannel distributors charged from 32 to 37 percent less than monopoly systems).

¹⁷⁶ *See* Thomas W. Hazlett, *Duopolistic Competition in Cable Television: Implications for Public Policy*, 7 Yale J. on Reg. 65, 96-97 (1990).

system rebuilds and upgrades that will provide subscribers new digital tiers and fast access to the Internet.¹⁷⁷ More than 4.5 million homes have been wired for two-way Internet access, and over 60,000 have signed up.¹⁷⁸

But cable operators have deployed state-of-the-art digital networks capable of providing telephony only when forced to in response to competition by incumbent phone companies. When Bell Atlantic announced plans to overbuild Jones Communications' cable network in Alexandria, Virginia, Jones responded with a \$35 million upgrade of its network.¹⁷⁹ As a result, Alexandria residents were among the first in the country to be offered packages of cable, Internet, and telephone services.¹⁸⁰ When Bell Atlantic built a \$70 million video network in Dover Township, Delaware, Adelphia Cable spent \$33 million to upgrade its own network to hybrid fiber/coax.¹⁸¹ Adelphia also cut its rates by 25 percent – more than \$6 per month – in response to Bell Atlantic's prices,¹⁸² and began offering telephone and Internet services.¹⁸³

¹⁷⁷ See J. McConville, *Chills, Spills Riding DBS Roller Coaster: Year of Ups, Downs*, Electronic Media, July 21, 1997. Microsoft alone invested \$1 billion in cable operator Comcast this summer, in order to help Comcast develop their two-way cable infrastructure to provide broadband services. L. Dignan, *Microsoft Invests \$1B in Comcast*, TechInvestor, June 9, 1997, <http://www.techweb.com/investor/newsroom/tinews/june/0609msft.htm> (quoting Microsoft Chairman Bill Gates as saying that investment would "accelerate" Comcast deployment of cable modem services).

¹⁷⁸ J. Peline, *Cable Modems Fight for Lead*, CNET News.com, Nov. 20, 1997, <http://www.news.com/SpecialFeatures/0%2C5%2C16615%2C00.html>. @Home leads the way, with 26,000, followed by Time Warner with 20,000 and MediaOne with 10,000.

¹⁷⁹ *Cable-Telephony Trials Planned Next Year in Alexandria and Chicago*, Communications Daily, Nov. 23, 1993, at 2 (quoting James Krejci, president of Jones Lightwave: "There are a lot of reasons for Alexandria. . . . Bell Atlantic said it wants to overbuild, and we want open competition.").

¹⁸⁰ D. Abrahms, *PEPCO Plans to Offer Phone, Cable Services*, Washington Times, Aug. 7, 1997, at B12.

¹⁸¹ R. Fazzi, *Adelphia Says New Services Coming Soon*, Asbury Park Press, May 15, 1996, at 1; R. Fazzi, *Bell Atlantic in Cable Picture*, Asbury Park Press, Jan. 30, 1996, at A7.

¹⁸² C. Price, *Telco Competition Taking Toll*, Broadcasting & Cable, Oct. 21, 1996, at 46.

¹⁸³ *Adelphia Aggressively Deploying Internet Services*, Cable Datacom News, Nov. 1996; R. Gebeloff, *Solutions to Internet Logjams Promised*, The (Bergen) Record, Mar. 3, 1997, at A01.

Similarly, Southern New England Telephone's \$4.5 billion network upgrade and aggressive statewide entry into video markets in Connecticut¹⁸⁴ impelled TCI to choose Hartford as the first U.S. locality in which to offer advanced digital telephone, cable, and Internet access services.¹⁸⁵ TCI has invested \$300 million in its Hartford network since 1995,¹⁸⁶ during a period in which TCI virtually stopped upgrading its systems in all but two other cities.¹⁸⁷ In June 1997, TCI raised its cable rates an average of 6.5 percent almost everywhere in the country – except Connecticut.¹⁸⁸

Wireless markets similarly demonstrate the effectiveness of deregulation and Bell Company entry in spurring new investment. In 1981, the Commission permitted wireline local exchange carriers, including the Bell companies, to provide cellular service.¹⁸⁹ Cumulative

¹⁸⁴ SNET first offered cable service in Farmington in March 1997, and added two other cities by July, with plans to add 25 more within two years. S. Higgins, *SNET Cable TV Service Expands Into Third City*, New Haven Register, July 3, 1997, at C12; W. Hathaway, *SNET Expanding Competition for Cable Subscribers*, Hartford Courant, July 3, 1997, at F1.

¹⁸⁵ *TCI Rolls Out Digitally in IL, CA*, Media Daily, Feb. 10, 1997. According to a TCI spokesman, Hartford was chosen for the network upgrade because of SNET's likely entry into cable. B. Keveney, *TCI Service to Expand Next Month*, Hartford Courant, Dec. 20, 1995, at A3 (citing Tim Fleury, TCI spokesman). TCI offered its advanced services in Hartford just one month after SNET had received permission from the state to compete with TCI. *TCI Rolls Out Digitally in IL, CA*, Media Daily, Feb. 10, 1997.

¹⁸⁶ B. Keveney, *TCI Service to Expand Next Month*, Hartford Courant, Dec. 20, 1995, at A3.

¹⁸⁷ TCI upgraded networks in two other markets, Fremont, California, and Arlington Heights, Illinois, as it was upgrading Hartford. It rolled out telephony and digital video services in February 1997. *TCI Rolls Out Digitally in IL, CA*, Media Daily, Feb. 10, 1997.

¹⁸⁸ P. Colman, *TCI Rate Hikes Run Gamut*, Broadcasting & Cable, June 2, 1997, at 68 ("In virtually all of its Connecticut systems . . . TCI has decided to hold off on rate increases for the time being. The primary reason: competition.").

¹⁸⁹ It stated that this was "the most practical way to make cellular service available to the public in a substantial number of the most populated and congested cities across the country within the next three to five years." *Inquiry Into the Use of the Bands 825-845 MHz and 870-890 MHz for Cellular Communications Systems; and Amendment of Parts 2 and 22 of the Commission's Rules Relative to Cellular Communications Systems*, 86 F.C.C.2d 469 at ¶ 38 (1981).

investment in wireless networks now totals over \$37.5 billion.¹⁹⁰ In the last year alone, wireless-related capital investments in the United States have exceeded \$10 billion.¹⁹¹ Since 1987, cellular subscribership has grown by an average of 53 percent per year.¹⁹² There are now nearly 50 million wireless subscribers, and in the last 12 months alone over 10 million new subscribers have been added.¹⁹³ According to industry analyst Paul Kagan, competition among wireless providers has brought down the rates for wireless services by as much as 43 percent in selected U.S. markets.¹⁹⁴ Another study by the Yankee Group shows that PCS prices are averaging about 20 percent below analog cellular in the 42 markets it studied where there is at least one PCS competitor.¹⁹⁵

Information service markets have also benefited from Bell Company entry, despite claims by opponents of information service relief that the Bell Companies would impede competition.¹⁹⁶ The opposite has proven to be true. In fact, the information services market is one of the fastest growing segments of the U.S. economy.¹⁹⁷ While the Bell Companies have contributed to this

¹⁹⁰ See *CTIA Pegs 12-Month Wireless Capital Investments at More than \$10 Billion*, *Wireless Today*, Oct. 24, 1997. CTIA Press Release, *Semi-Annual Check Up Shows Wireless Industry in Vigorous Health*, Oct. 26, 1997.

¹⁹¹ See *CTIA Pegs 12-Month Wireless Capital Investments at More than \$10 Billion*, *Wireless Today*, Oct. 24, 1997.

¹⁹² Second Annual Report, *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993*, 12 FCC Rcd 11266, 11283 (1997).

¹⁹³ CTIA Press Release, *Semi-Annual Check Up Shows Wireless Industry in Vigorous Health*, Oct. 26, 1997.

¹⁹⁴ See *Wireless Competition Undercuts Service Rates, Kagan Study Finds*, *Wireless Today*, Oct. 1, 1997.

¹⁹⁵ See *PCS Puts Downward Pressure On Wireless Pricing, Yankee Group Says*, *Wireless Today*, Sept. 30, 1997.

¹⁹⁶ See *United States v. Western Elec. Co.*, 993 F.2d 1572, 1582 (D.C. Cir. 1993).

¹⁹⁷ U.S. Commerce Dep't, *Industrial Outlook 1994* at 25-1 (1994).

growth and to the offering of innovative services,¹⁹⁸ their role is dwarfed by the likes of AT&T, MCI, WorldCom, IBM, TCI, Time Warner, America Online, EDS, and Microsoft. And since the Bell Companies first were allowed to enter the information services business, prices have fallen and output has ballooned. For example, the voice messaging business, where the Bell companies have focused their efforts, is growing at a double-digit rate; monthly service fees for voice messaging have dropped by half; and no Bell Company has more than a 3 percent share of this business.¹⁹⁹ Today, the information service providers are being rapidly overtaken by the Internet. Some 4,000 ISPs that already do \$3.1 billion a year in business are serving 50 million customers. No Bell Company ranks among the top 10 in total Internet subscribers.

VI. Summary and Conclusion

Today's Internet is plainly not the "advanced telecommunications capability" envisioned by Congress or the FCC. The upper levels of the network are too slow, too congested, too unstable, and too focused on urban, business customers to provide high-speed, high-bandwidth services to all Americans. Moreover, it is only getting worse, as the national backbones have been unable to meet racing demand and as the industry rapidly consolidates. But the companies best suited to bring an advanced network to residential customers – Bell Atlantic and the other Bell Companies – are prevented from doing so by a combination of regulatory barriers. Removal of these barriers will enable the Bell Companies to use their technical and financial clout to

¹⁹⁸ See *Bell Operating Co. Safeguards*, 6 FCC Rcd 7571, 7619-21 (1991).

¹⁹⁹ See J. Hausman and T. Tardiff, *Benefits and Costs of Vertical Integration of Basic and Enhanced Telecommunications Services*, April 6, 1995; MMTA, 1997 MultiMedia Telecommunications Market Review and Forecast 69 (1997) (voice processing industry revenues have grown from \$1.2 billion in 1991 to \$1.8 billion in 1996).

provide advanced Internet access services to all their customers and to build larger and faster backbones that can take advantage of the local technologies.

ATTACHMENT 3

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Dr. John H. Porter
Vice President
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November 7, 1997

I am Vice President for Information Systems and Technology at Boston University. Boston University is a major research institution and the third largest private university in the United States, with nearly 30,000 students and over 3,000 faculty. The University comprises fifteen schools and colleges, of which eleven offer undergraduate degrees and thirteen offer advanced degrees. Each year, more than 5,600 courses are offered in over 250 degree programs.

Boston University strongly endorses Bell Atlantic's request that they be permitted to provide high-bandwidth data communication services between LATAs and throughout their service region. This is a very thinly served market, particularly in New England, that would benefit greatly from additional providers and increased competition. We are encouraged that Bell Atlantic has both the resources and the interest to make advanced services available to the research and educational community that we have heretofore been unable to acquire.

Among the many educational and research activities at Boston University, one of the most resource-intensive in its computing and communication requirements is our program in computational science, which involves more than 500 faculty and students from a wide range of scientific and engineering disciplines engaged in nearly 150 different research projects. This activity is supported by many individual research grants from a variety of sources as well as by significant National Science Foundation (NSF) funding awarded to us in support of our high performance computing and networking infrastructure. We currently have a supercomputing complex consisting of a 38-processor SGI Power Challenge Array and a 192-processor SGI/Cray Origin 2000, giving us by a significant margin the largest university supercomputing center in New England and one of the largest at any institution.

We are also strongly affiliated with the NSF-funded National Computational Science Alliance (NCSA) at the University of Illinois, one of only two national supercomputing centers that emerged from the NSF's review and consolidation of its national supercomputing center program. We are a major partner in the NCSA effort, with important programs in several areas of research, education, and service provision. Our role as a regional supercomputing center, which was first funded under the NSF Metacenter Regional Alliances program, continues as a part of the NCSA partnership. This Boston University program, called MARINER, provides education and training programs, access to state of the art computing equipment, and opportunities for pilot projects, Internet connectivity and industrial

partnerships in New England. Researchers at a number of institutions both in the Boston area and in other parts of New England are affiliated with the MARINER project and are actively using our facilities and programs.

Because we have this long-standing and growing activity in computational science, with significant collaborations both regionally and nationally, we have long been interested in dramatically improving our connectivity with other institutions both in New England and across the country. We were one of the earliest institutions to seek an NSF award for connection to the vBNS national high-speed backbone and were awarded a connection grant in 1996. When we first began pursuing this connection, the Internet 2 Project had not yet become formalized, placing us at the beginning of what has now become a much more widely recognized need for institutions of higher education and other constituencies to establish a national high performance network to support a wide range of advanced research, educational, and social missions that cannot be supported on the existing commercial Internet.

Since receiving our vBNS grant, and especially since the Internet 2 Project has gained momentum, we and a number of other regional institutions have been trying to establish robust connectivity among ourselves and with the national network. The roadblock to this activity has been that the level of connectivity we seek for much of this work (OC-3, or 155 Mbits/sec, and up) is simply not available in most of our region or between the region and the national backbone. While we have options in the immediate Boston area, where Boston University, Harvard, and MIT are working cooperatively to establish high-speed connectivity among ourselves, and with Northeastern expected to join in the near future, we have not been able to get a connection out of the local area to the national backbone beyond DS-3, or 45 Mbits/sec. Needless to say, for several major universities to share one or a few such connections is a far cry from the level of connectivity we envision needing to support the collaborations, metacomputing, remote visualization, and other work we wish to move forward on. The problem is compounded for many of the other regional institutions we are also working with, including Brown, Dartmouth, the University of Massachusetts at Amherst, and the University of Maine, for they are not able to connect even regionally at better than DS-3.

Through our participation in the Internet 2 Project and in the East Coast Gigapop Consortium, we hope to make serious progress in advancing the state of high-performance networking regionally and nationally. We urge that every consideration be given to Bell Atlantic's request for regulatory relief to allow them to participate as a much-needed competitor in the sparsely served market for high-end data services.

Dr. John H. Porter
Vice President for Information Systems and Technology
Boston University



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11/14/97

I am writing on behalf of Brown University to strongly endorse Bell Atlantic's request for immediate regulatory relief to permit them to participate with the development of an advanced, multimedia, high bandwidth network for research and education. Brown is internationally recognized as a leading research institution, and high speed, broadband packet switching networks are essential to the emerging academic and research applications we require. Brown is deeply concerned that the emerging Internet2 and vBNS network is dominated by traditional IXC providers such as Sprint and MCI. Brown believes the best means to accomplish affordable access to the future wide-area broadband networks is to allow healthy competition among all potential providers.

Currently Brown is experiencing the failures of lack of competition for high bandwidth access in our attempt to acquire a DS3 link from Providence to Boston. Our service requests to MCI have been rejected due to "lack of capacity". Lack of competition has created a demand-supply relationship that is not in Brown's best interest.

It is Brown's view that Bell Atlantic is among the prime candidates for providing advanced education and research network resources. I believe that Bell Atlantic has the expertise and capital to contribute greatly to our desired result of affordable, reliable, high bandwidth access to our Ivy League partners and the world. Therefore, we believe that all possible avenues should be explored in order to provide Bell Atlantic the opportunity to compete fairly with Sprint, MCI and others to provide services for Internet2 and other research and education initiatives.

Sincerely,

A handwritten signature in cursive script that reads "Anthony R. Tanzi".

Anthony R. Tanzi
Director of Communications

George Mason University

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January 23, 1998

Mr. Dennis Elwell
Bell Atlantic Network Services, Inc.
600 East Main Street, Sixth Floor
Richmond, Virginia 23219

Dear Mr. Elwell:

On behalf of George Mason University (GMU), I am writing to support the concept of allowing regional telecommunications companies to provide advanced, high bandwidth, long distance services.

As a member of Virginia's higher education community and a charter member of the Internet-2 consortium, GMU is particularly interested in the promise of long distance research and education. In addition, GMU seeks to reach out into communities of domestic and international importance, to provide much needed interactive broadband educational services using broadband services.

We expect that as the requirements for high bandwidth connectivity between our institutions, and others, continues to gain energy, there will be a growing need for the interactive related services provided by companies like Bell Atlantic, GTE and others. In particular, GMU has an interest in what is known as the Network Virginia.

The Network Virginia, as the name depicts, has members located across the entire state of Virginia, including those areas that the regionals serve. Under the current rules, the regionals, many of whom are quite capable of providing these high bandwidth long distance services, are unable to because of the regulatory restrictions. This should be corrected.

GMU is not committed to any one provider of telecommunications services. We seek only to purchase the highest quality services at the lowest possible cost. As such, we believe that competition can best achieve that dual objective.

Sincerely,



Alan Merten



Jeffrey I. Schiller

Network Manager
Information Systems

November 7, 1997

VIA FACSIMILE

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Dawn Watson
Account Manager
Bell Atlantic

Subject: Support for Regulatory Relief

Dear Dawn,

I am the Network Manager at the Massachusetts Institute of Technology in Cambridge Massachusetts. MIT was one of the first institutions connected to the ARPANET and one of the pioneers of the Internet. Today we are a founding member of the Internet2 Project.

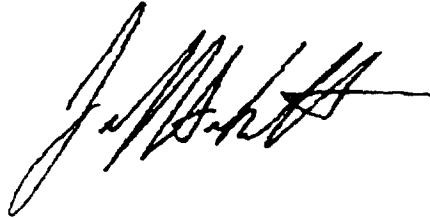
Internet2, by providing high-speed connectivity between universities, will pioneer the next phase of Internet development. Along with Harvard University and Boston University, MIT is constructing a Boston Area "gigaPoP", a high-speed regional network.

As we construct the gigaPoP and as we connect the various gigaPoP's being built around the country we will need to turn to service providers in the telecommunications sector. Today MCI is heavily involved with the National Science Foundation in constructing the "vBNS" network that is acting as the Internet2 backbone network. Other long distance providers are involved with providing high-speed networking both to universities and the commercial sector.

I write today on behalf of MIT to strongly endorse Bell Atlantic's request for immediate regulatory relief to permit them to participate in the development of an advanced, multimedia, high bandwidth network for research and education

As we strive to build the next generation of the Internet, it is vital that all players with the resources and expertise have the ability to competitively participate in its fruition. Bell Atlantic is clearly one of the players with the necessary expertise and resources, but they need to be permitted to play on a level playing field.

Sincerely,

A handwritten signature in black ink, appearing to read "J. Schiller", with a long horizontal flourish extending to the right.

Jeffrey L. Schiller

T: 315 453 2912
F: 315 453 3052

NYSERNet

November 6, 1997

NYSERNet
125 Elwood Davis Road
Syracuse, NY 13212-4311
www.nysernet.org

RE: Comments In Support of Regulatory Relief for Bell Atlantic

As NYSERNet's acting Executive Director, I offer the following comments in support of immediate regulatory relief that would allow Bell Atlantic Corporation to participate in the development of advanced network services in support of research and education.

Founded in 1985, and incorporated in the State of New York, NYSERNet is a private, not-for-profit, 501(c)(3) corporation with a mission focused on the advancement and application of internetworking technologies to meet the goals of public sector institutions. NYSERNet's activities are completely centered around the Internet and its evolution for the betterment of research, education, state and local government, health care, and economic development.

We are currently witnessing the rapid formation of a new market for advanced network services in support of research and education. Under the guidance of the newly formed University Corporation for Advanced Internet Development (UCAID), over 110 of the nation's leading universities are contributing capital and human resources to fuel the Internet2 initiative. Leading network equipment manufacturers and network service companies have associated themselves with the Internet2 initiative as corporate partners and corporate sponsors, making significant contributions to this initiative. The rapid acceptance of the Internet2 initiative by both the university and vendor communities, combined with the influx of U.S. Federal support, signals a rapidly growing demand for the development and deployment of advanced network services in support of research and education. Just as the evolution of the existing Internet created new markets for network hardware, transport and services, the development of Internet2, with the implementation of new network features and functions, will create new and expanded markets for network related products and services.

As with the evolution of the existing Internet, it is anticipated that these new advanced networking services for research and education will be deployed first on the regional level and extended into a new national network infrastructure through interconnection of these regional initiatives. Through the East Coast Gigapop Consortium (ECGC), NYSERNet, along with other Eastern U.S. advanced network implementors, we are laying the groundwork for establishing these inter-regional interconnections.

NYSERNet's regional advanced network initiative, NYSERNet 2000, is a series of related initiatives with a unifying theme at the core: to build an evolving, broadband testbed network for the trial and provision of network-based technological innovations in support of the research and education communities. The NYSERNet 2000 Program will promote research, technology

November 6, 1997
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transfer, interaction and exchange between user communities and developers - all of which is targeted at advancing the ability to conduct high quality research and education over the evolving advanced network infrastructure in New York State and across the nation. NYSErNet's member institutions represent, on a regional scale, one of the largest emerging national markets for advanced network services.

An open and competitive market for advanced network services is crucial to the development of this emerging market. Bell Atlantic is extremely well positioned to provide the inter-LATA and inter-regional connectivity services that are needed to begin the inter-connection of some of the early implementations of the regional components of Internet2. NYSErNet has a long and successful history of working with NYNEX in New York State. NYSErNet's past success has, in part, been the result of a mutually beneficial partnership with Bell Atlantic, formally NYNEX. Many of NYSErNet's member institutions are located in rural areas of New York State that present significant challenges for the delivery of advanced network services. In many areas of New York State Bell Atlantic has the physical infrastructure to provide inter-LATA services, but is prevented by regulatory restraints from providing these much needed services.

Sprint and MCI currently dominate the market for the inter-exchange transport of advanced network services. Sprint and MCI both operate advanced network services for the Federal Government, giving them a significant advantage in the growing market for these services. The research and education community would benefit immediately from the introduction of a significant new competitor in this market. Bell Atlantic has the resources to be this new competitor. Without immediate relief from regulatory restraint Bell Atlantic will not be able to enter this market early enough to develop into a true competitive force in this market.

Sincerely,



Gary Crane
Acting Executive Director

GRC/rj



UNIVERSITY OF MAINE SYSTEM

Computing and Data Processing Services

Computing Center
Neville Hall
Orono, Maine 04469-5752
207/581-3501

November 12, 1997

I am the Director of Technology Services for the University of Maine System (UMS). The UMS is comprised of seven institutions that are geographically dispersed throughout the state and serve 35,000 students. Many of the UMS institutions also support off-campus centers. The largest of the UMS institutions is the University of Maine which is the land grant institution. It offers doctoral programs in twenty-one fields of study and shares sea-grant status with the University of New Hampshire.

Over the past decade, the UMS has been successful in deploying a state-wide broadband network that provides a variety of strategic services to its many constituents. Broadcast television is used to deliver courses to more than 100 locations in the state. A high bandwidth data network interconnects the various locations of the university system as well as a number of other education, government, and non profit organizations. In addition, the university is the operator of a data network that interconnects all the K12 school and library buildings in the state. The University serves as the Internet Service Provider to all of these clients.

I am writing on behalf of the university system and its constituents to strongly endorse Bell Atlantic's request for immediate regulatory relief that will allow them to participate in the development of high speed broadband services for education and research.

At the present time, there exist extremely limited broadband facilities serving the State of Maine. Since August, the university has been trying to acquire high speed services to the Boston area. To date, no facilities have been found to accommodate our needs. While the university has been able to deploy broadband facilities in state, it has not been able to find the capacity for interstate connections. The UMS feels it must augment its instate broadband facilities with high speed interstate connections to compete in the global research and education market.



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We are moving to connect to the upcoming Internet2 and the vBNS. This Internet2 connection is crucial for researchers in a remote and rural state such as Maine and will require even greater interstate capacity.

The University of Maine System firmly believes that it is in its best interests and the interests of its users that Bell Atlantic be allowed to join in a healthy competition with other providers to offer these services in Maine. This would add to the limited facilities now available. We are confident in Bell Atlantic's ability and track record in developing broadband services beneficial to research and education.

A handwritten signature in cursive script, reading "Gerald F. Dube".

Gerald F. Dube
Director



Virginia Commonwealth University

November 13, 1997

Federal Communications Commission
Attention: Common Carrier Bureau
1919 M Street, N.W.
Washington, D.C. 20554

To Whom It May Concern:

Virginia Commonwealth University (VCU), is one of Virginia's largest and fastest growing universities. In addition, it is recognized as having one of the finest medical schools in the United States.

VCU, like most other institutions, requires higher bandwidth connectivity for both distance learning and telemedicine applications. As such, I am writing to endorse Bell Atlantic's request for immediate relief to provide advanced, high bandwidth, long distance services.

VCU, as a member of the Internet2 consortium, has demonstrated its interest in the promise of telecommunication technology in support of instruction, research, and medicine. We are currently conducting a trial where certain rural family clinics, are connected via high bandwidth applications back to the main hospital. VCU has plans to expand these applications in the very near future.

We expect that as the requirements for high bandwidth connectivity between Internet2 institutions continues to gain momentum, there will be a growing need for Internet2 related services provided by companies like Bell Atlantic. In particular, VCU has an interest in what is known as the East Coast Gigapop Consortium (ECGC).

The ECGC, as the name depicts, has members largely derived from the area that Bell Atlantic serves. Under the current rules, Bell Atlantic, although technically capable of providing these high bandwidth long distance services, is unable to because of the regulatory restrictions from which it now seeks relief.

VCU is not committed to any one provider of telecommunications services. We seek only to purchase the highest quality services at the lowest possible cost. We believe that unfettered competition can best achieve that dual objective.

Bell Atlantic has proven itself a valuable resource for the Commonwealth of Virginia's education and healthcare communities. It has already stepped up to the challenges of Internet2 with Network.Virginia, one of the first Internet2 qualified networks in the country. As such, Bell Atlantic has demonstrated its viability as a telecommunications provider deserving of the opportunity to compete in the telecommunications market.

Sincerely,

John Dayhoff, Vice Provost
Office of Information Technology
Virginia Commonwealth University

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VICE PROVOST
JOHN D. DAYHOFF



VIRGINIA COMMUNITY COLLEGE SYSTEM

James Monroe Building • 101 North Fourteenth Street • Richmond, Virginia 23219

January 16, 1998

**Mr. Dennis Elwell
Bell Atlantic Network Services, Inc.
600 East Main Street, Sixth Floor
Richmond, VA 23219**

Dear Mr. Elwell:

On behalf of the Virginia Community College System, I am writing to endorse Bell Atlantic's request for immediate relief to provide advanced, high bandwidth, long distance services.

As a member of Virginia's higher education community and an indirect benefactor of I-2 consortium, the VCCS is particularly interested in the promise of long distance research and education. The VCCS seeks to reach out into communities, like those found in rural southwest Virginia, to provide much needed interactive broadband educational services using broadband services.

We expect that as the requirements for high bandwidth connectivity between our community colleges, and other institutions including K-12, continues to gain energy, there will be a growing need for the interactive related services provided by companies like Bell Atlantic. In particular, the VCCS has made a commitment in what is known as Net.Work.Virginia and to a strong technology presence in the colleges. The VCCS's technology initiatives may be found at <http://www.so.cc.va.us/>.

Net.Work.Virginia, as the name depicts, has members located across the entire State, including those areas that Bell Atlantic serves. Under the current rules, Bell Atlantic, although technically capable of providing these high bandwidth long distance services, is unable to because of the regulatory restrictions from which it now seeks relief. We believe this is wrong.

Mr. Dennis Elwell

January 16, 1998

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The VCCS is not committed to any one provider of telecommunications services. We seek only to purchase the highest quality services at the lowest possible cost. As such, we believe that competition can best achieve that dual objective.

Bell Atlantic has proven itself as a valuable resource for the Commonwealth of Virginia's educational communities. It has already stepped up to the challenges of Net.Work.Virginia, one of the first statewide ATM networks in the country. As such, Bell Atlantic has demonstrated its viability as a telecommunications provider deserving of the opportunity to compete with other companies in the telecommunications market.

Sincerely,

A handwritten signature in cursive script, appearing to read "Lawrence J. Hengehold".

Lawrence J. Hengehold
Vice Chancellor
Information Technology Services

C: Dr. Arnold R. Oliver, Chancellor